

Frequently Asked Questions Regarding Spinosad

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Q: What exactly is Spinosad?

A: Spinosad is an insecticide used to control a variety of insect pests, including fruit flies, caterpillars, leafminers, thrips, drywood termites, and certain beetles. Spinosad is the common name of a mixture of spinosyn A and spinosyn D, two molecules derived naturally from a bacteria through fermentation. Spinosad is the active ingredient in several pesticides that are registered with the U.S. Environmental Protection Agency (EPA): Dow Agro's Conserve, SpinTor, Success, and Tracer.

Q: How does the U.S. Department of Agriculture (USDA) use Spinosad in efforts to eradicate the exotic fruit flies?

A: USDA's Animal and Plant Health Inspection Service (APHIS) and the California Department of Food and Agriculture (CDFA) use a Spinosad-based bait spray to fight exotic fruit flies. A small amount of Spinosad is mixed with bait that includes sugar and a protein byproduct of corn.

Q: How does Spinosad work?

A: Spinosad kills susceptible species by causing rapid excitation of the insect nervous system. Exotic fruit flies must feed on the bait mixture and ingest the insecticide.

Q: How is Spinosad applied?

A: Both aerial and ground applications of Spinosad bait spray may be used in fruit fly programs, depending upon the size and location of the outbreak. Aerial applications are performed with helicopters or fixed-wing aircraft. Ground applications involve the use of backpack or hand sprayers or those mounted on all-terrain vehicles for eradication, and hydraulic sprayers for crop certification in commercial, host-plant nurseries or orchards.

Q: What effect does Spinosad have on nontarget species?

A: The use of a bait mixture that targets fruit flies limits the impact on nontarget species not attracted to the bait. Because Spinosad is highly toxic to bees, eradication program officials provide special assistance to registered beekeepers.

Q: How long do treatments last?

A: Spinosad applications usually are administered 7-10 days apart until eradication is achieved, as determined by the absence of detections in baited traps. Applications continue for one life cycle of the pest beyond the date of the last detection in the treatment area to ensure that immature life stages, such as eggs and larvae, develop and are exposed to the treatment. Under tropical weather conditions, an exotic fruit fly can complete its life cycle in 21 to 30 days. Minimum application is 4 treatments covering 30 days.

Q: Are there any health risks associated with the Spinosad treatments?

A: Health risks from exposure to Spinosad bait spray treatments depend upon the amount of exposure and individual susceptibility. Spinosad poses low hazards and negligible risks when handled properly. Extremely large doses of Spinosad (at least 2,000 times the application rate for the program) are necessary for acute intoxication of humans and other mammals. The small amount of exposure that members of the public have with Spinosad bait spray is well below what is known to cause toxicity for humans.

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Q: How long will Spinosad residue remain in yards?

A: Residues from applications of Spinosad bait spray are short-lived. The half-life of Spinosad on cotton is only a few hours on a sunny day. The average length of persistence depends on the amount of sunlight and precipitation. Increased exposure to sunlight and increased rainfall accelerate the breakdown of Spinosad.

Q: What effect will treatment have on wildlife?

A: Spinosad as applied in exotic fruit fly eradication programs does not pose any hazard to mammals, birds, reptiles, amphibians, fish, or aquatic insects. Under normal circumstances, Spinosad poses no hazard to most pets. It can be toxic to those invertebrate species that ingest the bait, and temporary reductions in the populations of some terrestrial insects could occur.

Q: Does Spinosad cause cancer or birth defects?

A: There is no evidence of carcinogenicity of Spinosad based on chronic rodent feeding studies. Reproductive and developmental toxicity occur only at exposures much greater than any exposures that could occur from applications of Spinosad bait spray.

Q: Can Spinosad damage the eyes?

A: Spinosad showed slight conjunctival irritation, or agitation of the membranes lining the eyelids, in primary eye irritation tests. The low levels of exposure from Spinosad bait spray applications are insufficient to cause visual problems.

Q: How does Spinosad affect people with allergies, chemical sensitivity, and other special health problems?

A: Immunological responses to chemical exposure within a population vary. Spinosad is not a skin sensitizer, but some individuals may have allergic or hypersensitive reactions to Spinosad or the bait.

Q: What precautions should people take in the treatment area?

A: People should do their best to minimize exposure. Avoid unnecessary contact with pesticides. Remain indoors during Spinosad bait spray applications. Do yard work before treatment begins rather than after. Rinse off outdoor play areas. Wash skin and clothing if contact occurs. There is no need for people to relocate during aerial applications of Spinosad bait spray if they take proper precautions to avoid potential exposure.

Q: Is it okay to eat fruits and vegetables exposed to treatments?

A: Before cooking or eating homegrown vegetables, rinse them with water, just as you would those purchased from the grocery store. Washing further minimizes any potential exposure.

Q: What is the swimming pool re-entry interval after an area has been treated with Spinosad?

A: There is no re-entry interval, and the low rate of applications ensures that exposure from swimming is not of concern.

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Q: Why is it that these applications of Spinosad are toxic to insects but not to people?

A: The sensitivity of insects to Spinosad is far greater than humans because of difference in physiology, site of toxic action, and types of enzymes present. The bait treatment used in the eradication programs is attractive to flies. As a result, flies eat the pesticide, resulting in greater exposure.

Q: Can exotic fruit fly become resistant to Spinosad?

A: Resistance to Spinosad would require the survival of multiple generations of flies exposed to Spinosad.

Q: Could there be any cumulative effects from other exposures that I could receive?

A: The low application rate ensures that exposures are unlikely to have any effects on humans. The rapid degradation rate of Spinosad ensures that it will not persist long in the natural environment. Spinosad is readily eliminated from or broken down by enzymes in the human body. Cumulative exposures would require multiple exposures within a short period of time Spinosad. The eradication program applications of Spinosad bait spray do not allow survival of exotic fruit flies, so the development of resistance is highly unlikely. The rapid degradation of Spinosad also ensures that sublethal exposures to flies are unlikely to result from residues.

Q: Has EPA authorized the use of Spinosad for exotic fruit fly eradication?

A: Yes, tolerances are in place to allow use in exotic fruit fly programs. Spinosad has been granted permanent tolerances for some fruits (including citrus), nuts, vegetables, cotton, and meat.

Q: Will Spinosad contaminate groundwater?

A: Spinosad adheres readily to organic matter and is relatively immobile in soil. Spinosad is not expected to leak in groundwater. Test results indicate that Spinosad typically decomposes before reaching groundwater.

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Q: Can't eradication be done without using toxic pesticides?

A: Unfortunately, no method is currently available that can effectively eradicate fruit fly populations without some use of pesticides. The best we can do at present is to minimize the use of pesticides by using a combination of methods to reduce the amount of pesticide that is needed. While we are confident that the manner in which pesticides are used to eradicate the Mediterranean fruit fly does not pose any significant risk to the public, we are continuing to search for non-chemical approaches to dealing with infestations in urban areas.

Q: How long are treatments necessary?

A: How long treatments will last depends on a number of factors. A temperature based time model is used to gauge the length of time it takes for a generation of flies to complete its reproductive life cycle and pass through all stages of development. Eradication depends on assuring that there is an insufficient population of flies left to continue breeding. Past experience indicates that treatments may go on for anywhere from four months to a year, or longer. Much depends on the time of year when treatment begins. Treatments are usually more frequent during warmer weather, but may not last as long. Treatments during cooler weather are usually less frequent, but need to be continued for a longer period of time.

Q: What exactly is Malathion?

A: Malathion is an organophosphate chemical, developed in early 1950s. It is a popular home-garden insecticide that is used worldwide, and is one of the least hazardous of all insecticides known. Besides being used on home gardens and landscapes, it has widespread use on dairy farms, chicken ranches, and on orchards and commercial food crops. It is used on pets and livestock to protect them from fleas and biting flies. It has been marketed in a shampoo to treat children for head lice. It is used regularly in urban areas for mosquito abatement. Malathion has a record of safe and effective use in past exotic pest eradication programs in California and elsewhere.

Q: I've heard that Malathion is related to WWII nerve gas. Is this true?

A: Malathion is derived from the same class of chemicals as were some nerve gasses, but it is a liquid, and does not have nerve gas characteristics. Methanol and ethanol belong to the same chemical class, yet have a very different toxic potentials. Ethanol is in alcoholic beverages. Methanol is wood alcohol and can cause severe neurological damage if one drinks it.

Q: Is Malathion safe? I've heard it is highly toxic and dangerous to use.

A: Toxicity is dose related. No chemical can be said to be absolutely "safe". Safety pertains to how one handles a material. Even highly hazardous materials can be used safely. Malathion is not particularly dangerous or hazardous to use. Relatively large doses are necessary for it to be toxic to humans or other animals. The amount applied for fruit flies, and the manner in which it is applied (in a bait), does not expose members of the public to a significant toxic risk. The small amount of Malathion people might come in contact with as it is applied, either from the ground or by air, is well below what is known to be toxic for humans. Concentrated solutions of Malathion are sold for use by home gardeners in many neighborhood stores that carry gardening supplies.

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Q: How is Malathion used to kill exotic fruit flies?

A: The California Department of Food and Agriculture, in cooperation with the USDA, has developed an eradication program that uses Malathion mixed with a food bait that attracts flies. The Malathion and bait mixture is applied as tiny droplets that stick to surfaces they contact. Adult flies are killed when they are attracted to the bait and eat it. Uniform applications are necessary if all flies are to be killed. In addition to killing mature flies that may have already mated, flies emerging from pupae require nutrients before they begin to mate. If Malathion is present in the bait, immature flies that eat the bait as they emerge are eliminated before having a chance to reproduce.

If an area of infestation is limited in size, it may be possible to use backpack sprayers to apply the Malathion bait mix directly onto the foliage of plants where exotic fruit flies may be found. Two or three applications are generally necessary to effectively rid the environment of existing mature flies prior to beginning the release of sterilized flies. When infested areas are extensive or widely scattered, it may become necessary to apply the bait mixture from aircraft. Aerial applications usually begin late in the evening. Most of the droplets reach the ground within a few minutes after application aircraft pass overhead. Only scattered slower falling droplets may be detected for a short while after this. After 30 minutes, settling is no longer visibly detectable.

In the past, very large areas of infestation have required numerous repeated aerial applications of Malathion in bait in some areas because an insufficient number of sterilized flies were available for release. The prospect for repeated aerial application of Malathion in bait has been greatly reduced by increasing sterile fly production capability. However, one cannot accurately predict the extent future potential infestations may reach, and there is some chance that repeated aerial application may need to be considered, depending on the total area infested in the State at any given time.

Q: I've heard that the Malathion used to eradicate flies is only 95% pure. What's the other five percent?

A: The Malathion used for fruit fly eradication is known as "technical grade". When Malathion is formulated (manufactured) a number of impurities remain in the final concentrate. (formulation) While these impurities contribute to overall toxicity, they are present when the toxicity of Malathion is tested, and are therefore accounted for. All the impurities together, amount to only five percent of the final product. There are approximately 16 identified impurities, most of which are present in an amount less than one percent. Some of the most prominent impurities are: isomalathion, malaaxon, and various phosphorus esters that are byproducts of chemical reactions that produce Malathion.

Q: Why not use pure Malathion

A: Normally, pure Malathion is not produced commercially. It is only necessary to remove minor impurities when they hamper product performance, either by interfering with desired activity or causing undue adverse reactions. The technical grade material used for fruit fly eradication is the same material used in virtually all commercial Malathion products. Toxicity testing has been done using this same material.

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Q: Is it possible to inhale the spray?

A: The droplets are tiny, but do not remain in the air like aerosols do. During the brief time droplets are falling after release from aircraft, there is little likelihood of breathing in any significant amount. The concentration of Malathion in air, due to evaporation after application is very small: in the parts per trillion ranges.

Q: What happens to the Malathion after it's applied?

A: Malathion gradually breaks down after it is applied. Breakdown products are generally much less toxic than Malathion and eventually return to their normal elemental state. Malaoxon, which is formed when oxygen replaces sulfur in the Malathion molecule, is more potent than Malathion. Environmental monitoring during and after Malathion bait applications has detected relatively small amounts of either Malathion or malaoxon. The amount of residue found in the environment does not reasonably suggest a meaningful toxic threat to people or the environment. Malaoxon itself breaks down more rapidly than Malathion once it is formed. Repeat applications of Marathon are necessary because not enough is left to effectively kill flies two to four weeks after it has been applied.

Q: What is the bait?

A: The bait is primarily protein, carbohydrate and fat with some inorganic salts, such as sodium chloride (table salt), and water. It is made mostly from corn, and is similar to processed food.

Q: What about Malathion getting into swimming pools?

A: Almost all swimming pools and wading ponds are deep enough so that the concentration of Malathion residues, after aerial application of Malathion in bait, will not reach the drinking water action level of 160 parts per billion, established by the California Department of Health Services. Malathion residues degrade very rapidly in swimming pool water, and are virtually gone in about 48 hours. This has been verified through independent monitoring conducted during previous fruit fly eradication projects.

Q: Could Malathion be harmful to pets or wild animals?

A: Except for fish, Malathion, as applied for fruit fly eradication, does not pose a hazard to pets and wildlife. It is used in dairy barns and chicken coops, and is applied directly to pets and livestock to rid them of body pests, such as fleas and biting flies. Shallow pools, such as garden fish ponds should be covered when application take place, and uncovered the next morning. This will prevent direct contamination of the pond and avoid oxygen deprivation, which could occur if the cover is left on too long.

Q: What effect will the Malathion have on other insects, like honeybees and other beneficial insects?

A: There may be temporary reductions in the population of some insects, and temporary increases in others, based on individual species susceptibility. Populations normalize once again, after treatments stop. Honeybees are not attracted to the bait. Some bees may be killed, however, because they may crawl through bait droplets while foraging.

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Q: Are there any precautions people should take when the Malathion mixture is applied?**A: Yes.**

- Malathion bait droplets can damage certain automobile paints. This hazard is similar to that of fruit juices, tree saps, raw egg, and the like. AUTOMOBILES should be put in garage or covered when bait applications are made. If left out, they should be washed off the following morning.
- Some plastic SKYLIGHTS AND AWNINGS may be spotted (stained). They should be covered during, or washed off after, spraying.

Additional prudent measures anyone might take to reduce exposure include:

- Remaining indoors when applications are being made.
- Bringing in CHILDREN'S TOYS. If left out, wash them before allowing children to play with them.
- Before cooking or eating homegrown FRUITS AND VEGETABLES, rinse them with water, just as you would those purchased from a store.
- Cover PICNIC TABLES, or hose them off after spraying.
- Wash EXPOSED SKIN SURFACES with soap and water after touching surfaces that have bait residues.
- Don't leave LAUNDRY hanging out during application. Launder soiled clothing before it is worn.
- Do YARD WORK before, rather than immediately after spraying.